

Base Realignment and Closure  
Program Management Office West  
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San Diego, California 92108-4310

CONTRACT NO. N62473-06-D-2201  
CTO No. 0028

## GEOTECHNICAL EXPLORATION WORK PLAN

March 28, 2008

INSTALLATION RESTORATION SITES 5 AND 10  
(BUILDINGS 5 AND 400) STORM DRAIN AND SEWER LINE  
TIME-CRITICAL REMOVAL ACTION  
FORMER NAVAL AIR STATION ALAMEDA  
ALAMEDA POINT, ALAMEDA, CALIFORNIA

DCN: ECSD-2201-0028-0003



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## ABBREVIATIONS AND ACRONYMS

TtEC	Tetra Tech EC Inc
IR	Installation Restoration
ASTM	American Society for Testing and Materials
SPT	Standard Penetration Test

## **1.0 INTRODUCTION AND PURPOSE**

### **1.1 SITE BACKGROUND**

Tetra Tech EC Inc. (TtEC) is conducting a project for the Navy to remove and replace storm drains potentially containing radioactive contaminants and soil surrounding the storm drains and sewer lines at Installation Restoration (IR) Sites 5 and 10 at Alameda Point, Alameda, California. The storm drains to be removed are associated with Outfall F storm drain system and are located in and around Building 5 and 400. Refer to Figure 1. This includes any sections of the pipelines at IR Sites 5 and 10 that were replaced during the 1998 to 1999 removal that do not meet the current release criteria. This removal action will serve to minimize the potential threat posed by future migration and/or off-site release of radio-active material.

### **1.2 SCOPE OF WORK**

To support the removal activities, a geotechnical exploration will be conducted along the alignment (at a distance greater than 15 feet from the centerline of the storm/sewer alignment) and in one proposed reference area. A second reference area may be selected in coordination with the Navy during the course of project execution. The data collected from the exploration will be used for several purposes:

- To provide data for the design of shoring structures
- To determine soil conditions to assist with field planning for excavation and materials handling
- To investigate any soil type variations along the line path to understand variable conditions that may be encountered and to aide in selecting appropriate background reference areas for radiological measurements

No radiological contamination is expected within the area of the borings (due to the distance from the sewer/storm lines). Details of the proposed exploration are provided in the next section of this Work Plan.

## 2.0 GEOTECHNICAL EXPLORATION AND TESTING

### 2.1 DRILLING AND SAMPLING

The tasks associated with this scope of work will consist of advancing soil borings and collecting soil samples using a hollow-stem auger rig with a cage (drilling mud may be required due to heaving sands). A total of 16 borings will be drilled (see Figure 1). One of the borings will be drilled near a proposed reference area and will be completed as monitoring wells/peizometers. Additional borings may be requested by the Project Engineer during the field activities. It is expected that the borings will encounter groundwater at depths of approximately 2 to 6 feet below ground surface. Boring depths will reach approximately 25 feet below the pavement surface.

Utilities will be clearly marked and the upper 5 feet of the boring will be excavated by use of a hand auger. Drilling will be attempted at each of the planned locations; however, it is possible that drilling will be ineffective if debris is encountered. If drilling fails at a selected location (refusal or no sample retrieval), one alternate location will be selected in the field, and drilling at that new location will be attempted. If the second attempt fails, no further drilling effort will be required for that location. The Project Engineer will designate samples for laboratory testing.

Sampling will be performed in accordance with the American Society for Testing Materials (ASTM) methods. Standard Penetration Tests (SPTs) with split-spoon samplers will be conducted using the ASTM D-1586 method. The standard method allows different drilling methods and states *Any drilling equipment that provides at the time of sampling a suitably clean open hole before insertion of the sampler and ensures that the penetration test is performed on undisturbed soil shall be acceptable.*

Shelby tube samples of fine-grained soils/sediment (i.e., silt and clay) will be obtained using the method ASTM D-1587. As with the SPT test, ASTM allows flexibility in drilling methods. Shelby tube samples will be obtained by pushing an open-ended tube into the sediment and retrieving the sample. Where fill soils are underlain by very soft native sediment, a piston sampler (i.e., Gus or Osterberg type device) may be necessary to achieve good recovery.

SPT split-spoon samples will be collected from just below the pavement and every 5 feet thereafter in accordance with ASTM methods. In addition, undisturbed shelly tube samples will be taken between the split-spoon samples. This sampling routine may be modified in the field due to site conditions. When soft, fine-grained soil/sediments (silt or clay) are observed, shelly tube samples will be taken between the split-spoon samples as directed by the Project Engineer.

## 2.2 LABORATORY TESTING

Physical properties of fill soils and natural sediments in selected samples will be analyzed to assess site geologic characteristics and engineering properties of sediment. Data and grain size distribution, specific gravity, and Atterberg limits will be used to classify sediment. . Data can also be used to design various shoring systems.

Sediment from the borings will be taken to an off-site laboratory for analysis of physical characteristics and geotechnical engineering properties. It is assumed that no chemical analyses will be performed. Table 2-1 provides the proposed schedule of testing.

**TABLE 2-1**  
**PROPOSED TESTING SCHEDULE**

Test	Method	Sample Type and Quantity	Approximate Number of Samples
Atterberg limits	ASTM D-4318	S/S – 1 pound	8
Consolidation test	ASTM D-2435	Shelby – 6 inch	4
Grain size	ASTM D-422	S/S – 1 pound	12
Organic content	ASTM D-2974	S/S – ½ pound	18
Permeability	ASTM D-2434	Shelby – 6 inch	4
Specific gravity	ASTM D-854	S/S – TBD	10
Triaxial shear, unconsolidated, undrained	ASTM D-2850	Shelby – 6 inch	8
Water content	ASTM D-2216	S/S – ½ pound	12

**Abbreviations and Acronyms:**

ASTM – American Society for Testing and Materials

S/S – Split-Spoon

## 2.3 REPORTING

A draft and final report will be prepared to present results of the subsurface exploration and laboratory testing.



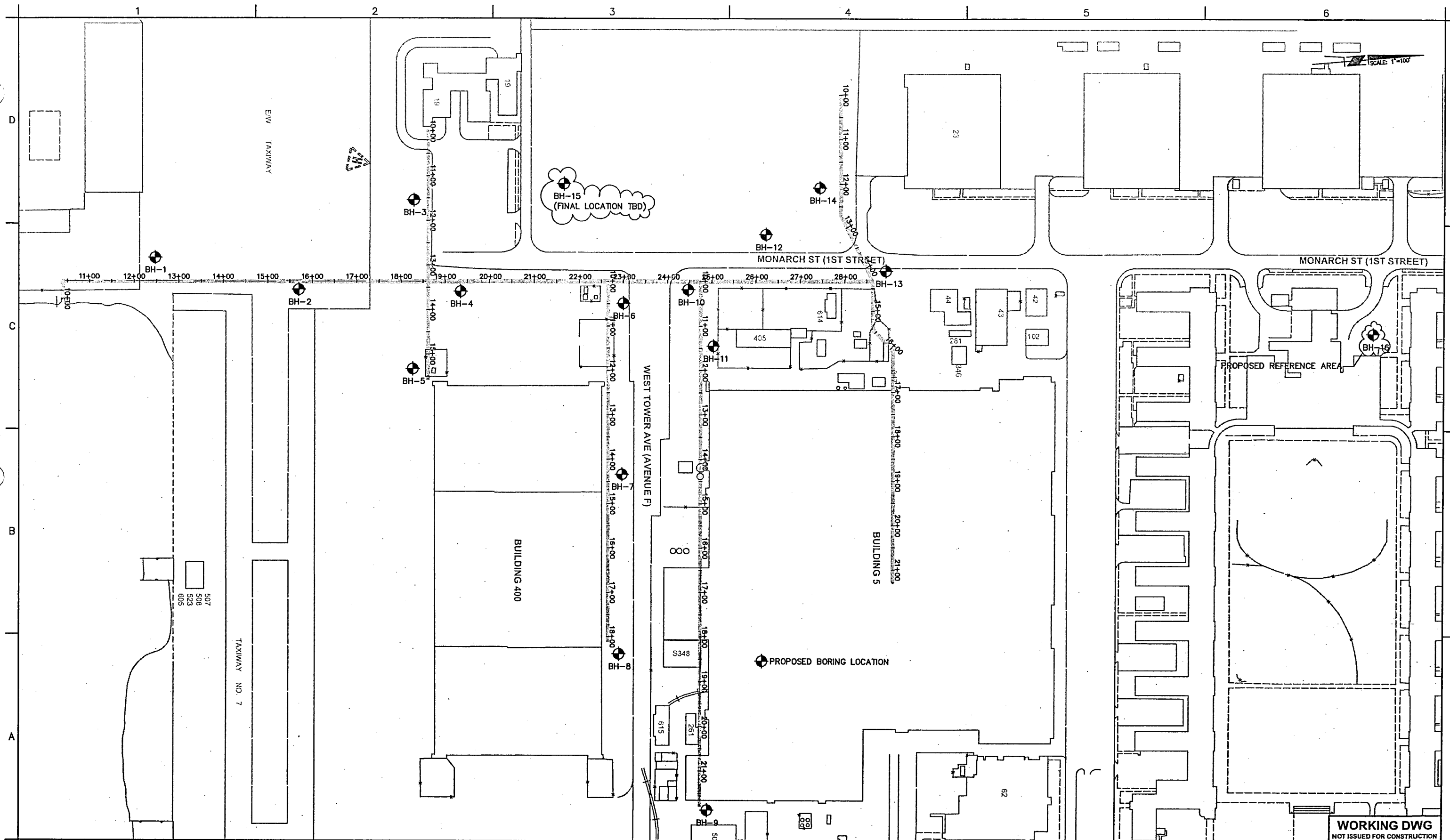
### **3.0 WASTE MANAGEMENT**

Waste generated in the field will include soil cuttings that may contain bentonite drilling mud. The materials will be containerized in 55-gallon drums or 20-cubic-yard roll-off bins with lids. The soil cuttings will be characterized for disposal. Samples of soil cuttings will be collected at a frequency of one composite sample from each set of containers from each borehole location. The samples will be analyzed for constituents as indicated in the IR Sites 5 and 10 Sampling and Analysis Plan.

### **4.0 HEALTH AND SAFETY**

Excavation regulations and permit requirements of California Occupational Safety and Health Administration (CAL-OSHA) will be followed. All excavations will be conducted in accordance with requirements of California Health and Safety Code, California Code of Regulations Title 8, Sections 1539 to 1541, and 29 Code of Federal Regulations, Parts 1910 and 1926. All field activities will be conducted in accordance with the IR Sites 5 and 10 Health and Safety Plan.

## FIGURES



### SCALE VERIFICATION

BAR LENGTH EQUALS ONE INCH  
WHEN PLOTTED 1:1



IF NOT ONE INCH  
ADJUST SCALE ACCORDINGLY

[illegible]

**CTO 28  
BUILDINGS 5 AND 400  
STORM DRAIN AND SEWER LINE  
TIME CRITICAL REMOVAL ACTION  
FOR IR SITES 5 AND 10  
ALAMEDA POINT, CALIFORNIA**



**TETRA TECH**  
1230 COLUMBIA STREET, SUITE 750  
SAN DIEGO, CA 92101-8538  
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RESPONSIBLE ENGINEER:

DRAWN BY:

CHECKED BY

PROJECT ENGINEER:

**DESIGN FILE:**

DATE: 03/28/2008

SCALE: NOT TO SCALE

**SHEET SIZE: D**

**WORKING DWG**  
NOT ISSUED FOR CONSTRUCTION

## PLAN

### GEOTECHNICAL EXPLORATION

**DRAWING  
FIGURE 1**

**SHEET**  
**1 of 1**

REVISION  
C